

## CHAPTER SIX

# TRANSMISSION AND GEARSHIFT MECHANISM

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### EXTERNAL SHIFT MECHANISM

The external shift mechanism is located on the same side of the crankcase as the clutch assemblies and can be removed with the engine in the frame. To remove the shift drum and shift forks, it is necessary to remove the engine and split the crankcase. This procedure is covered under *Shift Drum and Shift Forks* in this chapter.

#### NOTE

*The gearshift lever is subject to a lot of abuse. If the vehicle has been in a hard spill, the gearshift lever may have been hit and the shift shaft bent. It is very hard to straighten the shaft without subjecting the crankcase to abnormal stress where the shaft enters the case. If the shaft is bent enough to prevent it from being withdrawn from the crankcase, there is little recourse but to cut the shaft off with a hacksaw very close to the crankcase. It is much cheaper in the long run to replace the shaft than risk damaging a very expensive crankcase.*

### Removal

Refer to **Figure 1** for this procedure.

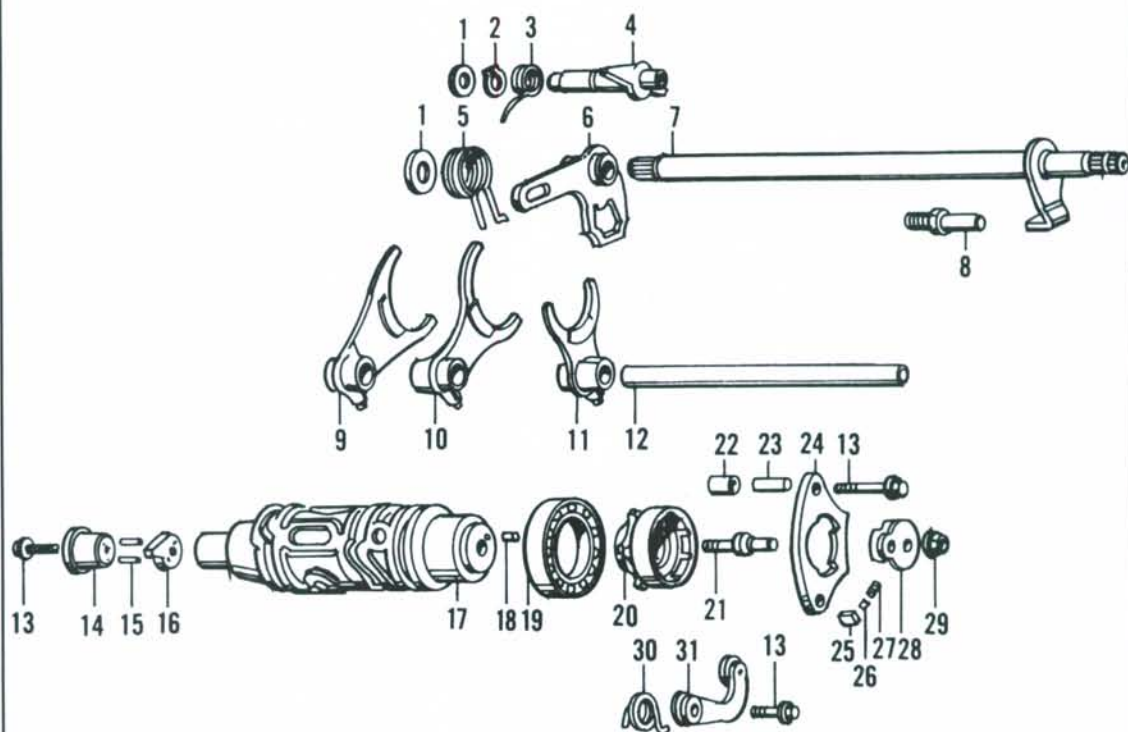
1. Place the vehicle on level ground and set the parking brake.
2. Drain the engine oil as described in Chapter Three.
3. Shift the transmission into NEUTRAL.
4. Remove the right-hand and left-hand crankcase covers as described in Chapter Four.
5. Remove the thrust washer and the clutch lever (**Figure 2**).
6. Withdraw the gearshift spindle assembly (**Figure 3**). Don't lose the small washer on the backside of the gearshift spindle assembly.

#### NOTE

*See the NOTE in the introduction to this procedure regarding a bent shaft if the assembly is difficult to remove.*

7. Remove the shift collar (A, **Figure 4**) from the drum shifter.
8. Remove the bolts (B, **Figure 4**) securing the guideplate and the gearshift drum shifter assembly and remove the assembly.

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**EXTERNAL AND INTERNAL SHIFT MECHANISM**

1. Thrust washer

2. Circlip

3. Spring

4. Reverse shaft arm

5. Spring

6. Gearshift arm

7. Gearshift spindle

8. Return spring pin

9. Right-hand shift fork

10. Center shift fork

11. Left-hand shift fork

12. Shift fork shaft

13. Bolt

14. Neutral/reverse rotor

15. Pin

16. Reverse stopper arm

17. Shift drum

18. Pin

19. Bearing

20. Shift drum center

21. Shifter bolt

22. Collar

23. Dowel pin

24. Guide plate

25. Ratchet pawl

26. Plunger

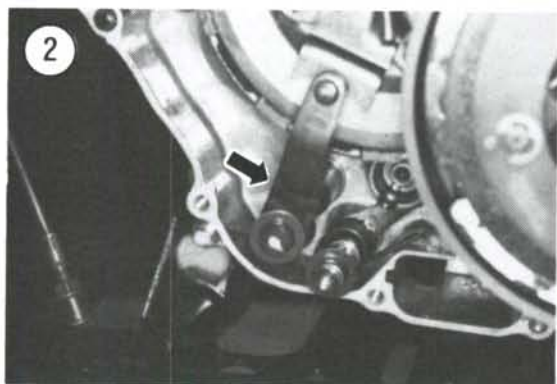
27. Spring

28. Drum shifter

29. Nut

30. Spring

31. Shift drum stopper arm



9. Remove the collars (**Figure 5**) and dowel pins (A, **Figure 6**) and the bearing stopper plates (B, **Figure 6**).

10. Remove the bolt (A, **Figure 7**) securing the stopper arm and remove the stopper arm.

11. Remove the bolt (B, **Figure 7**) securing the shift drum center and remove the shift drum center.

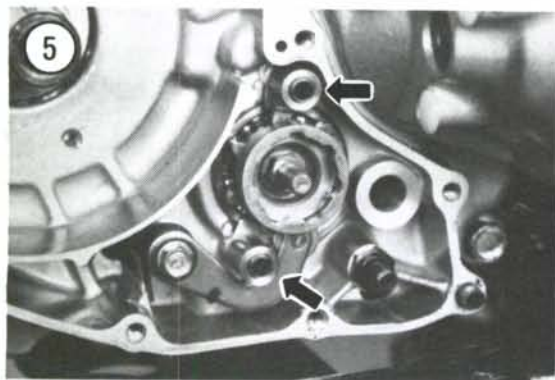
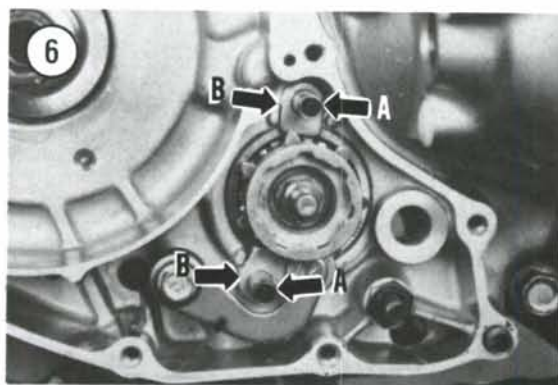
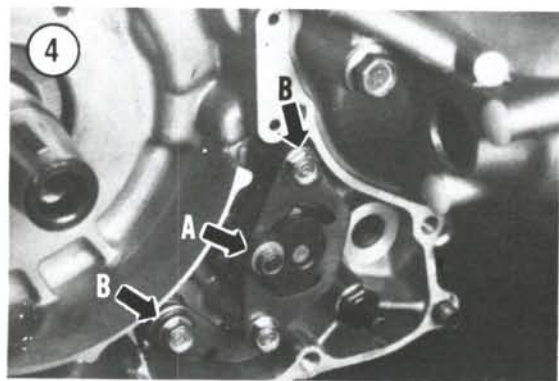
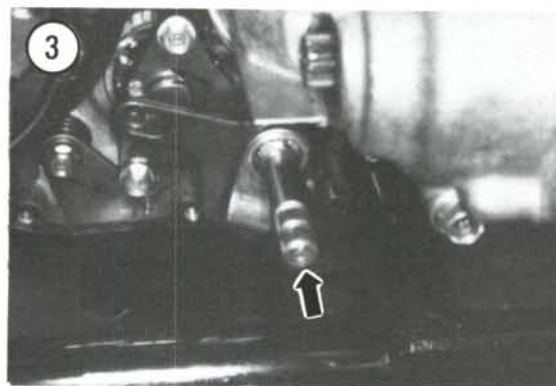
### Inspection

1. Inspect the return spring on the gearshift spindle assembly (**Figure 8**). If broken or weak, they must be replaced.

2. Inspect the gearshift lever assembly shaft (**Figure 9**) for bending, wear or other damage; replace if necessary.

3. Inspect the ramps on the shift drum center. They must be smooth and free of burrs or cracks. Make sure the locating pin fits snugly into the stopper plate and the shift drum. Replace if necessary.

4. Disassemble, inspect and assemble the gearshift drum shifter assembly as follows:



**NOTE**

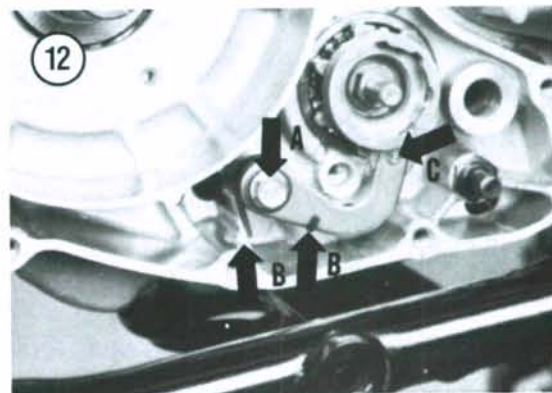
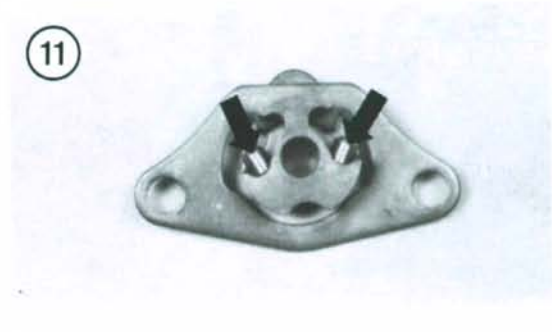
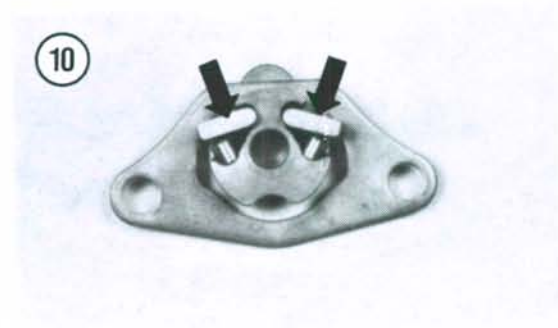
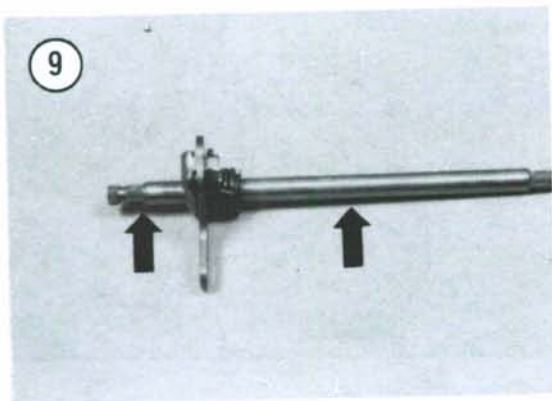
*Work down close to the top of a workbench as there are many small parts that will come out in the next step.*

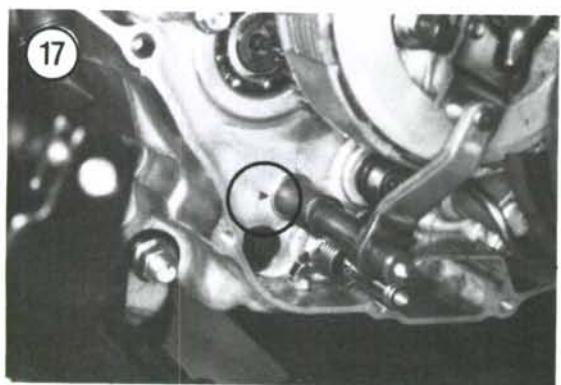
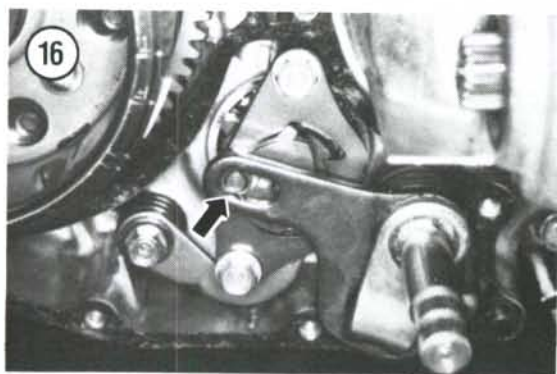
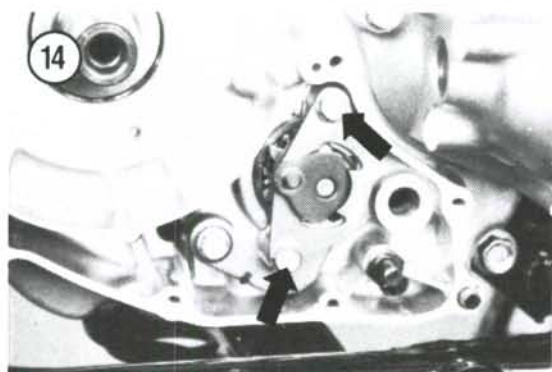
- a. Hold onto the ratchet pawls and remove the drum shifter from the guide plate. If they have not come out already, remove the springs, plungers and ratchet pawls from the drum shifter.
- b. Inspect the springs, plungers and ratchets pawls for wear or damage. Replace as a complete set if any are worn or damaged.
- c. Install the drum shifter into the guide plate.

- d. Install the springs and the plungers (**Figure 10**) and the ratchet pawls (**Figure 11**) into the drum shifter.

**Installation**

1. Align the hole in the backside of the shift drum center with the pin in the gearshift drum and install the shift drum center. Tighten the bolt securely.
2. Install the stopper arm and bolt (A, **Figure 12**). Tighten the bolt only finger-tight at this time.
3. Hook the return spring (B, **Figure 12**) onto the stopper arm and onto the ledge on the crankcase.

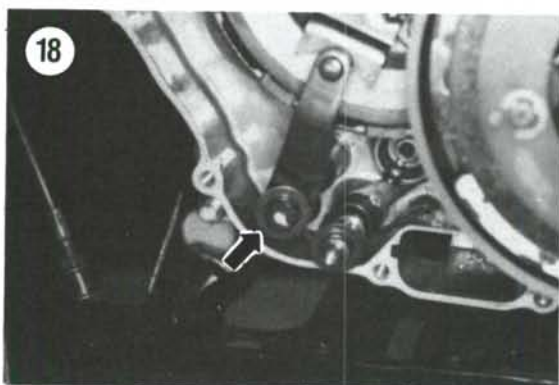




4. Locate the stopper arm onto the shift drum center (C, **Figure 12**) and tighten the stopper arm bolt securely.
5. Install the dowel pins (A, **Figure 6**), the bearing stopper plates (B, **Figure 6**) and the collars (**Figure 5**).
6. Compress the springs under the ratchet pawls and install the gearshift drum shifter and guide plate assembly (**Figure 13**). Install the bolts (**Figure 14**) and tighten securely.
7. If removed, install the shift collar (A, **Figure 4**) onto the pin on the drum shifter.
8. Make sure the small washer (**Figure 15**) is in place on the gearshift spindle.
9. Install the gearshift spindle assembly. Make sure the gearshift spindle assembly is correctly positioned onto the stopper plate (**Figure 16**).
10. Align the index mark on the clutch lever with the raised arrow on the crankcase and install the clutch lever (**Figure 17**).
11. Install the thrust washer (**Figure 18**) onto the clutch lever.
12. Install the right- and left-hand crankcase covers as described in Chapter Four.
13. Refill the engine with the recommended type and quantity of engine oil as described in Chapter Three.
14. Adjust the clutch as described in Chapter Three.

### TRANSMISSION AND INTERNAL SHIFT MECHANISM

To gain access to the transmission and internal shift mechanism, it is necessary to remove the engine and split the crankcase. After the crankcase has been split, both transmission shafts must be disassembled within the crankcase—they cannot be removed intact. The output gear case can only be



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